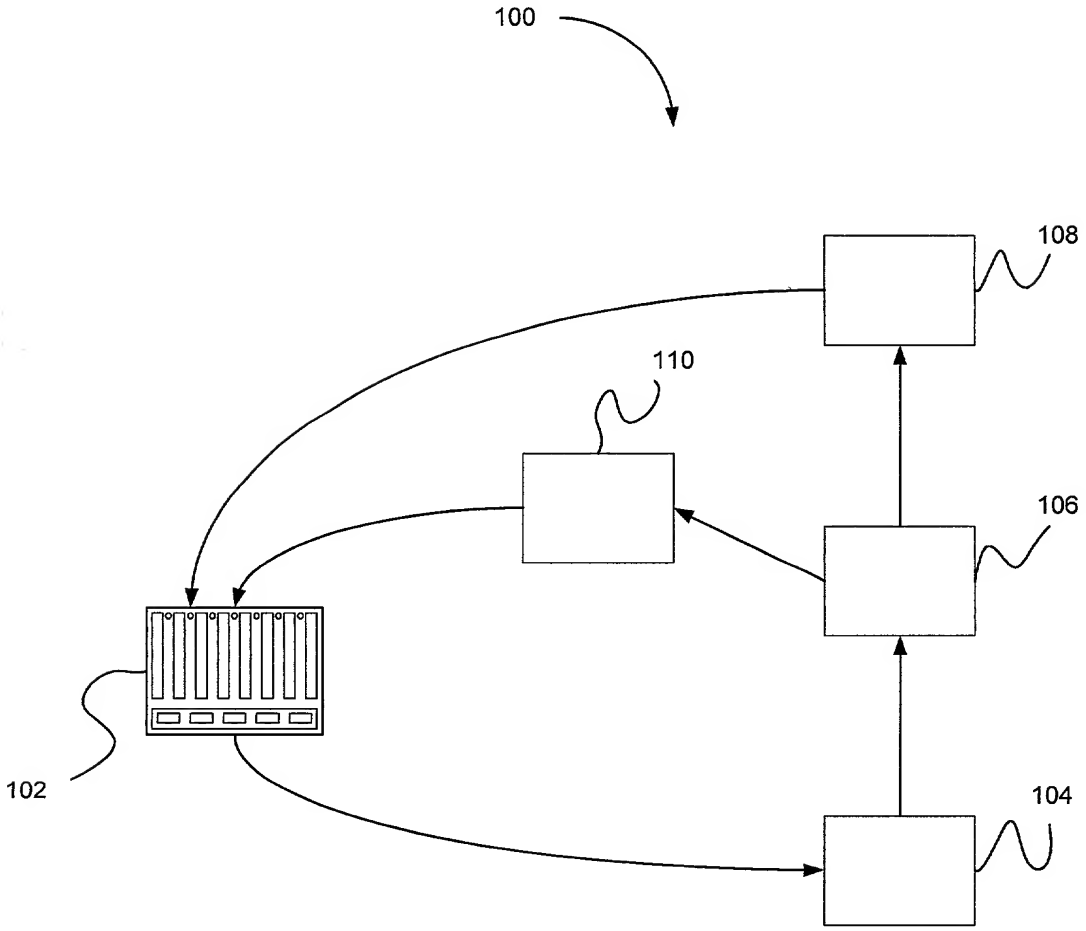


FIGURE 1

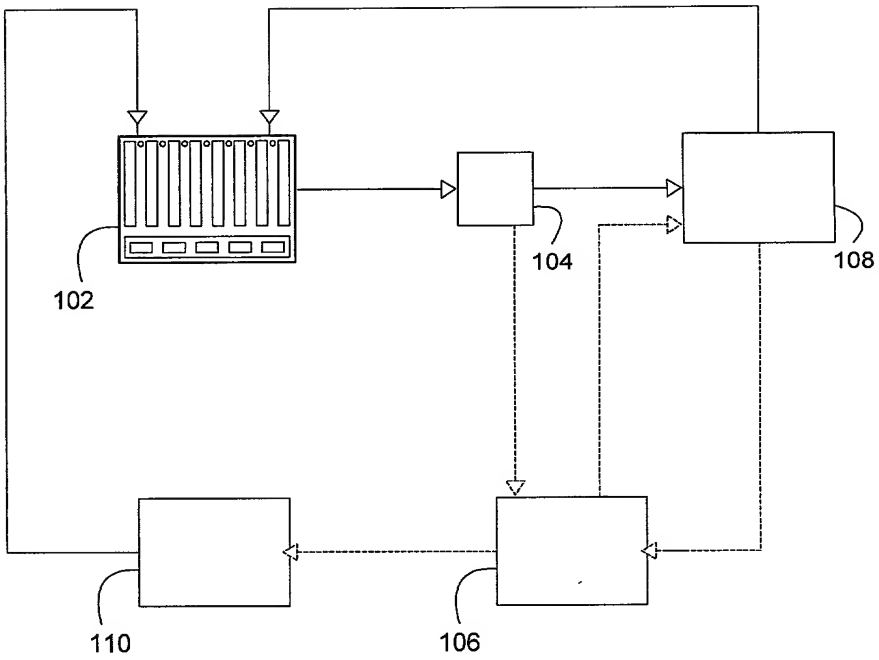


FIGURE 2

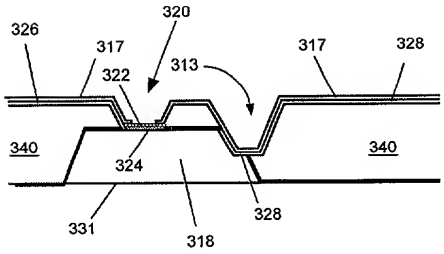
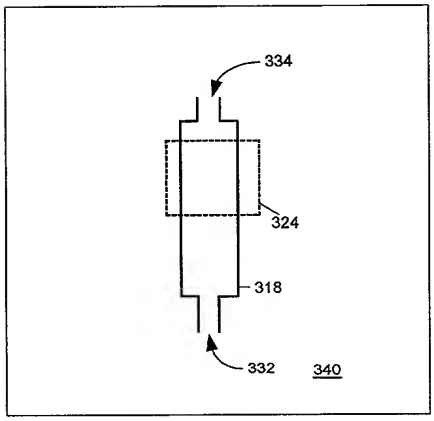


FIGURE 3



TOP SIDE
BACK SIDE

FIGURE 4

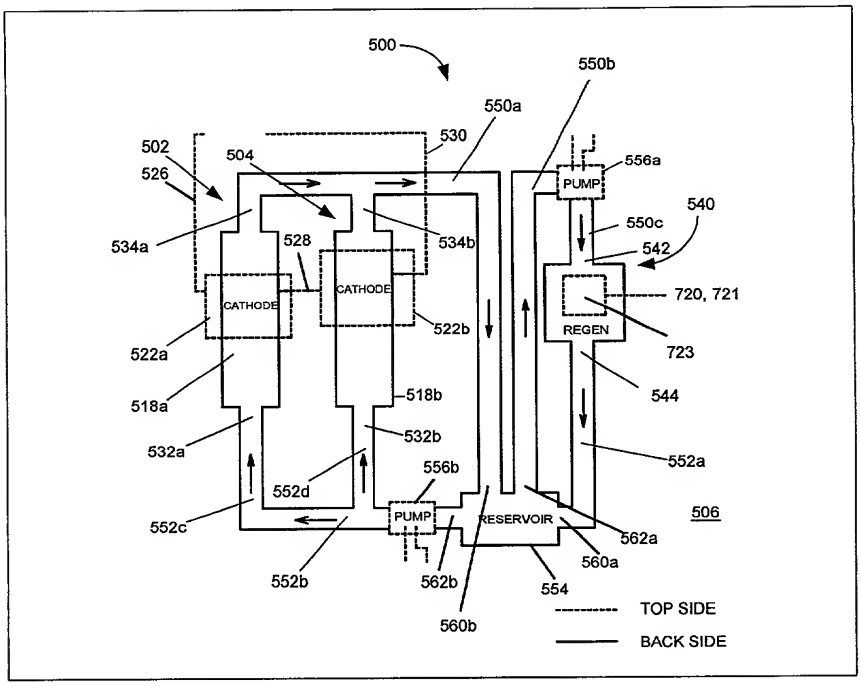

500
550b
550a
530
502
526
504
556a
PUMP
540
550c
542
534a
528
534b
CATHODE
CATHODE
720, 721
REGEN
522b
522a
723
544
518a
518b
532a
532b
552a
556b
552d
552c
PUMP
RESERVOIR
506
562a
560a
552b
562b
554
560b
TOP SIDE
BACK SIDE

FIGURE 5

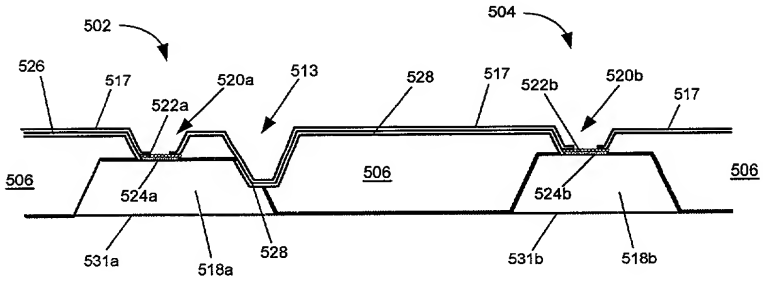


FIGURE 6A

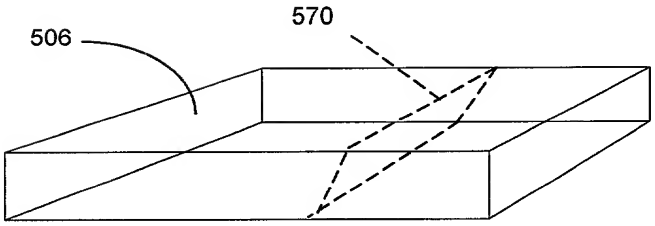


FIGURE 6B

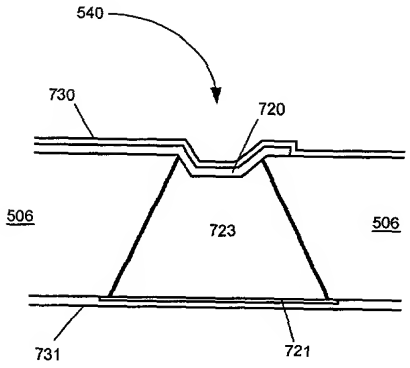


FIGURE 7

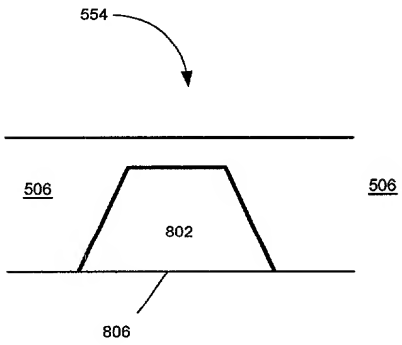


FIGURE 8

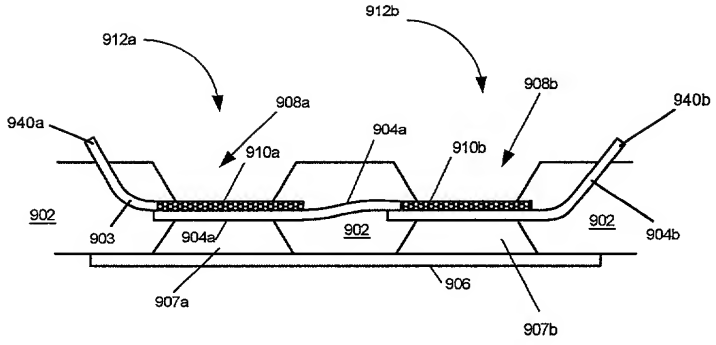

912b
912a
908b
908a
940b
940a
904a
910a
910b
902
902
902
903
904a
904b
906
907a
907b

FIGURE 9A

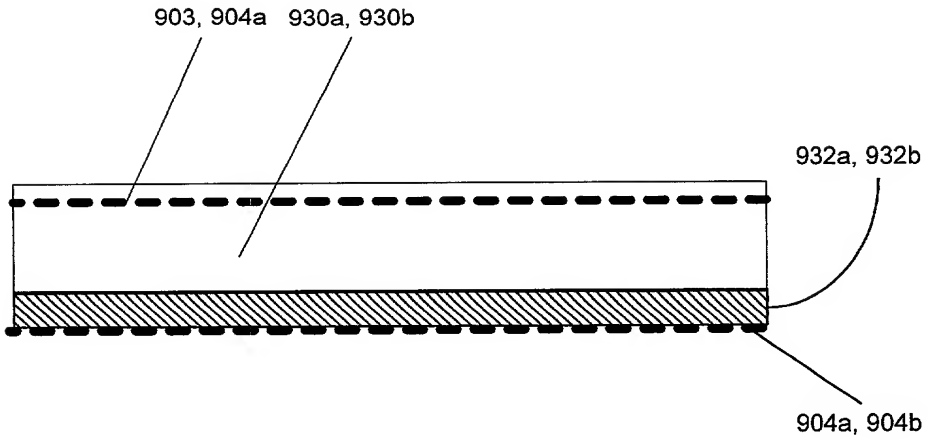


FIGURE 9B

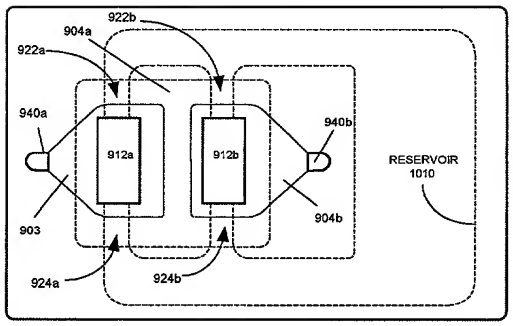

922b
904a
922a
940a
912a
912b
940b
RESERVOIR
1010
903
904b
924a
924b

FIGURE 10

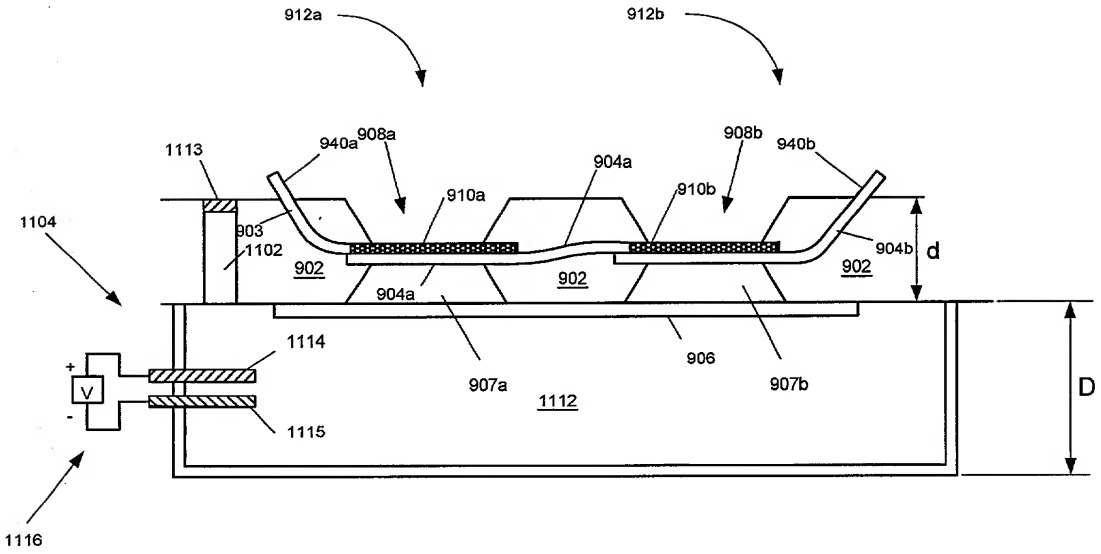

912a
912b
1113
940a
908a
908b
940b
904a
910a
910b
1104
903
1102
902
902
902
904b
d
904a
1114
906
907a
907b
D
1112
V
+
-
1115
1116

FIGURE 11

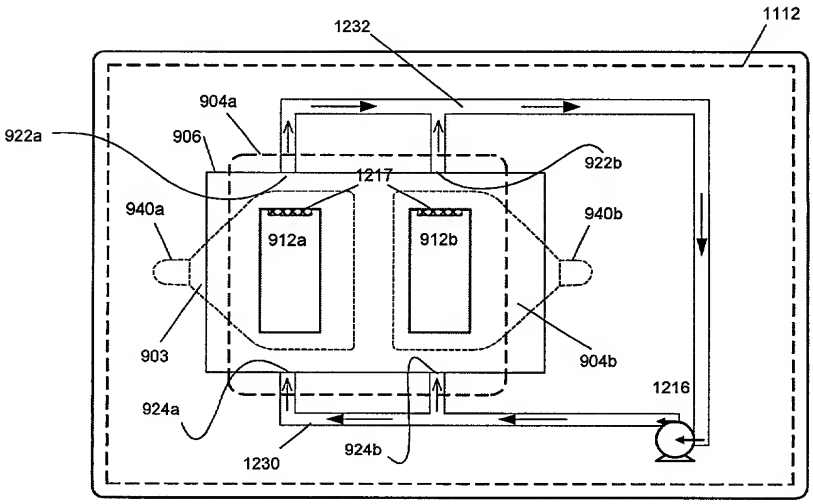

1232
1112
904a
922a
906
922b
1217
940a
912a
912b
940b
903
904b
1216
924a
924b
1230

FIGURE 12

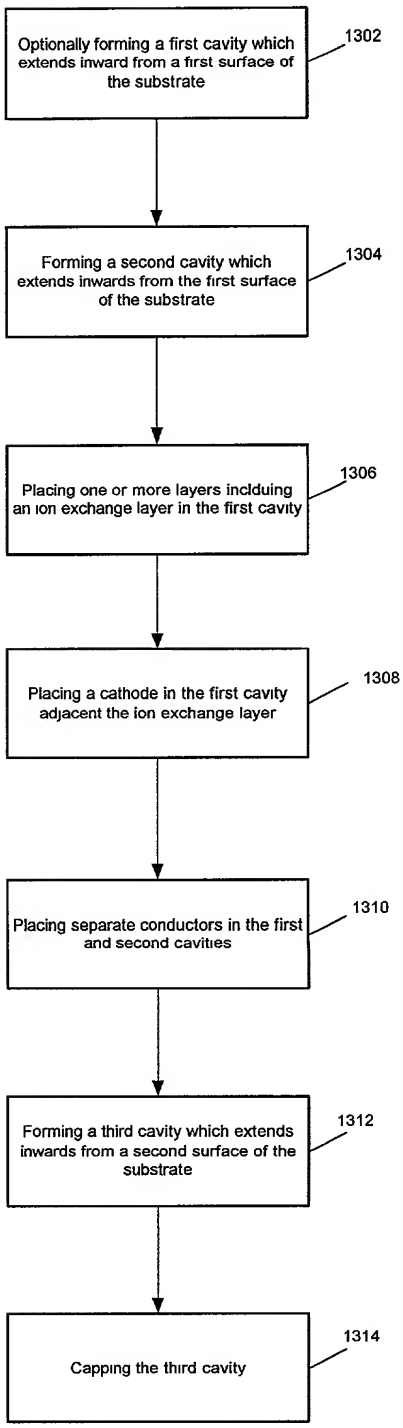
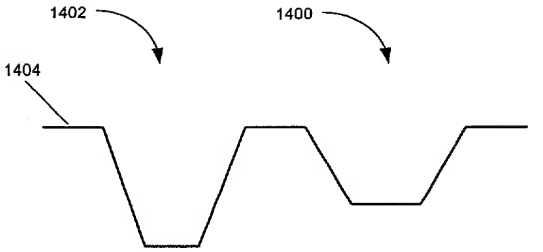
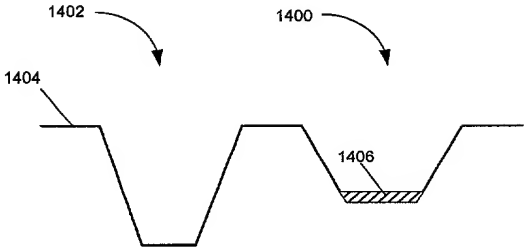

Optionally forming a first cavity which extends inward from a first surface of the substrate
1302
Forming a second cavity which extends inwards from the first surface of the substrate
1304
Placing one or more layers including an ion exchange layer in the first cavity
1306
Placing a cathode in the first cavity adjacent the ion exchange layer
1308
Placing separate conductors in the first and second cavities
1310
Forming a third cavity which extends inwards from a second surface of the substrate
1312
Capping the third cavity
1314

FIGURE 13



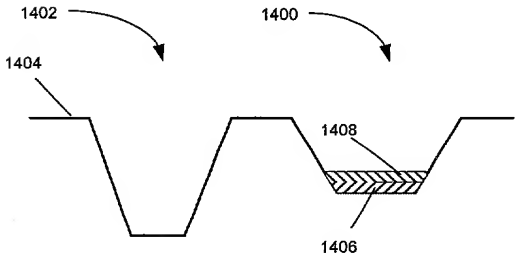
Step 1
Form Cathode Well
and Contact Well

FIGURE 14A



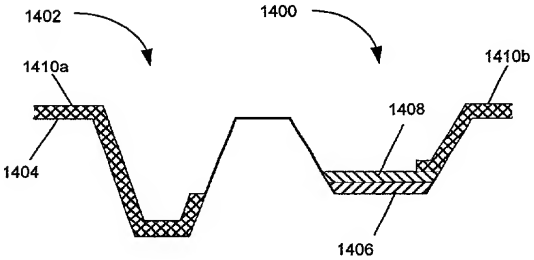
Step 2
Deposit and Pattern Ion Exchange Layer
(Hydrophilic Polymer)

FIGURE 14B



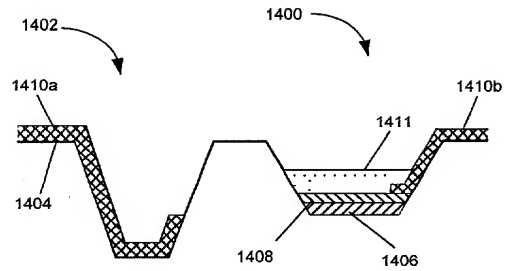
Step 3
Deposit and Pattern Catalyst Layer
(Catalyzed Carbon)

FIGURE 14C



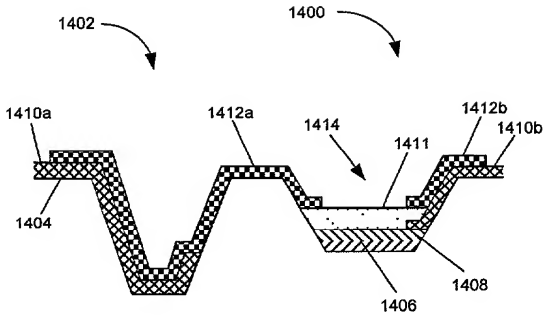
Step 4
Deposit Metal Contact Layer

FIGURE 14D



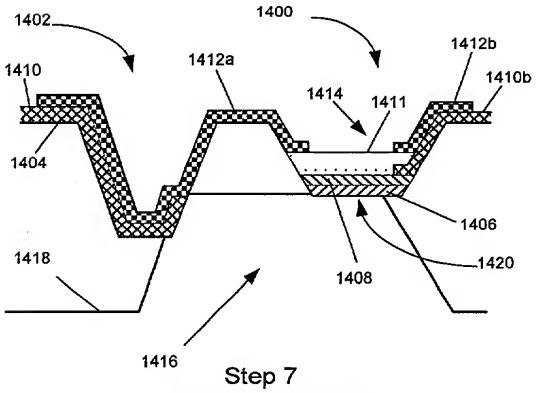
Step 5
Deposit and Pattern Porous Backing Layer
(Hydrophobic Polymer)

FIGURE 14E



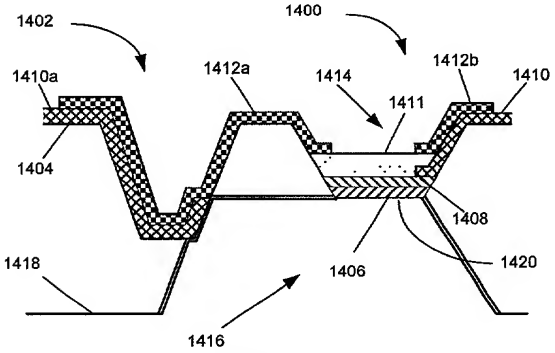
Step 6
Deposit and Pattern Oxide (Insulator) Layer

FIGURE 14F



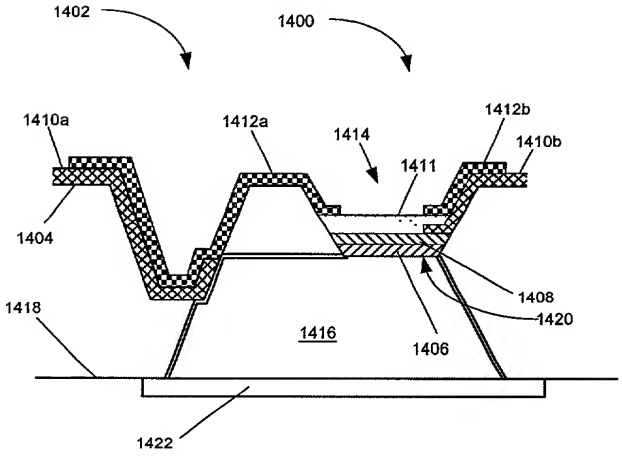
Step 7
Form Anode Cavity

FIGURE 14G



Step 8
Add Inert Conducting Layer to Anode Cavity
(Ion Exchange Layer is Masked)

FIGURE 14H



Step 9
Add Lid to Anode Cavity

FIGURE 14I

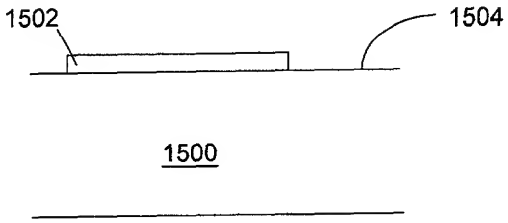


FIGURE 15A

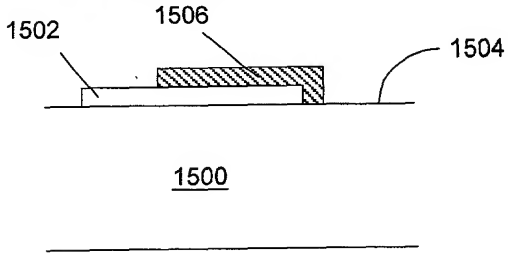


FIGURE 15B

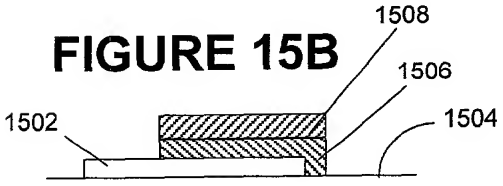


FIGURE 15C

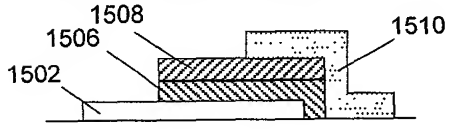


FIGURE 15D

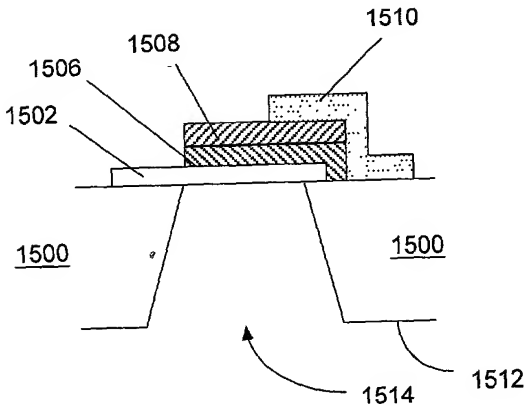


FIGURE 15E

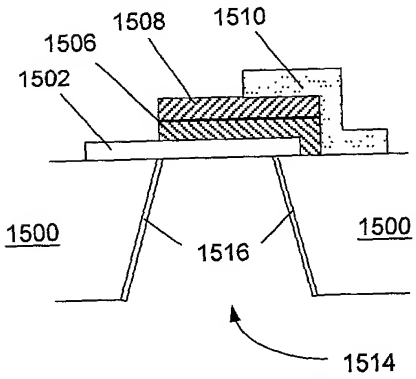


FIGURE 15F

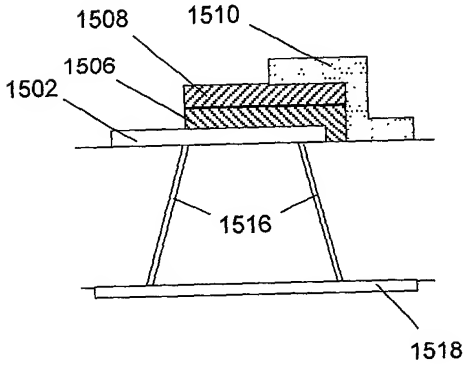


FIGURE 15G

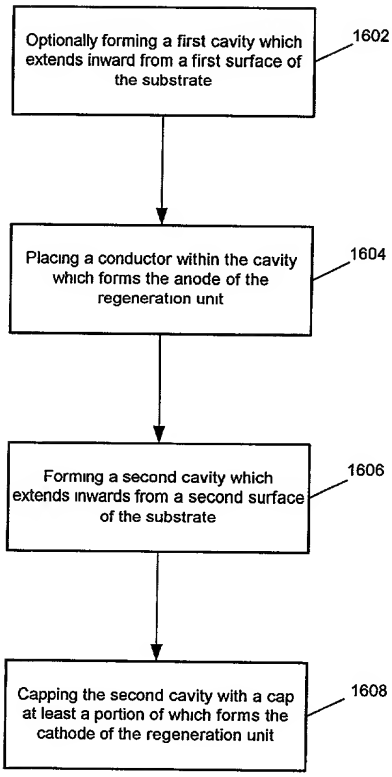

Optionally forming a first cavity which extends inward from a first surface of the substrate
1602
Placing a conductor within the cavity which forms the anode of the regeneration unit
1604
Forming a second cavity which extends inwards from a second surface of the substrate
1606
Capping the second cavity with a cap at least a portion of which forms the cathode of the regeneration unit
1608

FIGURE 16

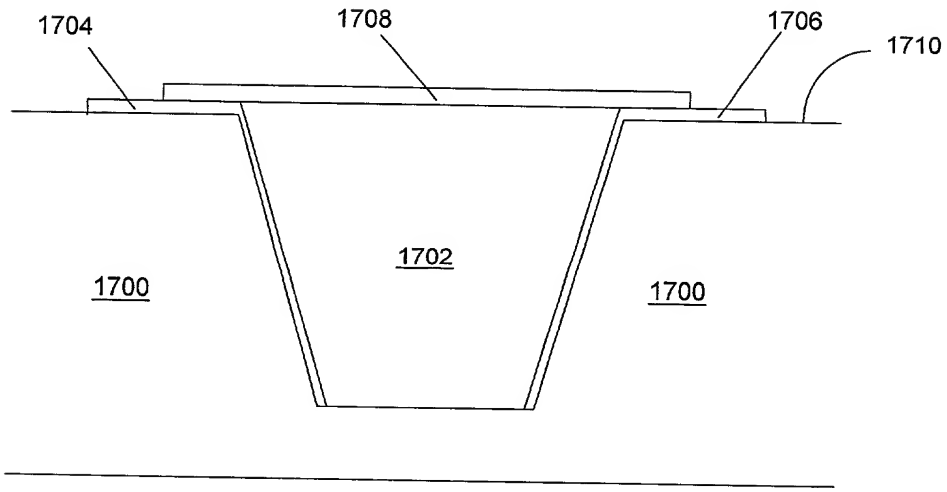


FIGURE 17

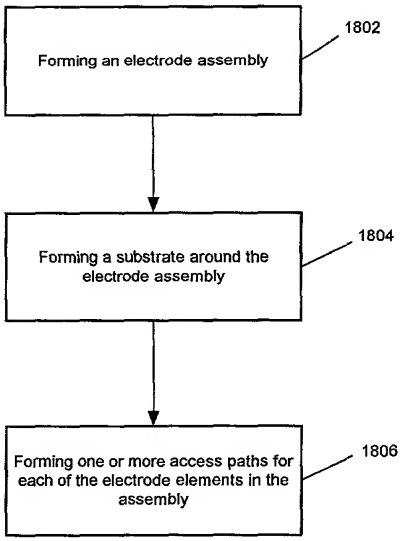

Forming an electrode assembly
1802
Forming a substrate around the electrode assembly
1804
Forming one or more access paths for each of the electrode elements in the assembly
1806

FIGURE 18